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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 10/055,266 | 01/22/2002 | Ki-won Choi | 9898-208 | 6747 |
| 20575 | 7590 | 10/11/2006 | EXAMINER | |
| MARGER JOHNSON & MCCOLLOM, P.C. 210 SW MORRISON STREET, SUITE 400 PORTLAND, OR 97204 | | | NADAV, ORI | |
| | | | ART UNIT | PAPER NUMBER |
| | | | 2811 | |

DATE MAILED: 10/11/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/055,266

Applicant(s)

CHOI, KI-WON

Examiner

Ori Nadav

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 21 July 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 28-38, 40 and 42-46 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 28-38, 40 and 42-46 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION***Drawings***

The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, distinction between the elements "bond pads (110)" and circuit solder ball pads (11)", and the elements "printed circuit pattern (106)" and "wire bond (112)", must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Specification

The disclosure is objected to because of the following informalities: Numerals 106, 108 and 110, which appear in figure 5, are not recited in the disclosure.

Appropriate correction is required.

Claim Objections

Claims 44 and 46 are objected to because of the following informalities: In claim 44, the phrase "the semiconductor chip" should read "a semiconductor chip". In claim 46, the phrase "first and second circuit patterns" should read "first and second conductive circuit patterns".

Appropriate correction is required.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 28-38, 40 and 42, rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The claimed limitations of a wire bond having one end affixed to the third bond finger and the other end affixed to one of the bond pads; and a wire bond having one end affixed to the second bond finger and the other

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end affixed to the third bond fingers, as recited in claim 28, are unclear as to whether the first "a wire bond" is the same as the second "a wire bond". Two different elements cannot have the same name, and the same element must be recited as "said".

The claimed limitations of "a printed circuit pattern", as recited in lines 7 and 14 in claim 28, are unclear as to whether the first "a printed circuit pattern" is the same as the second "a printed circuit pattern". Two different elements cannot have the same name, and the same element must be recited as "said".

The claimed limitations of a printed circuit pattern formed between each of a group of first printed circuit bond fingers and a corresponding first solder ball pad, and a wire bond formed between each of the group of first printed circuit bond fingers and a corresponding bond pad, and a printed circuit pattern formed between the second printed circuit bond finger and the second printed circuit solder ball pads, as recited in claims 28 and 38, are unclear as to whether the term "between" refers to the physical location between the elements or it means connecting the two elements together.

The claimed limitation of a second wire bonding, as recited in claim 38, is unclear as to which element applicant refers.

The claimed limitation of "first bond fingers", as recited in dependent claim 42, is unclear as to whether this element is the same element as the "first printed circuit bond fingers", which is recited in claim 28, or it is a different element.

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the

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art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 29-31 and 43-46 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. The specification recites a first bond finger having a conductive circuit pattern connecting it to one of the solder ball pads, a second bond finger having a first wire bonding connecting it to one of the bond pads, and a second wire bonding unit connecting the first and the second bond fingers thereby connecting said one bond pad to said one solder ball pad. Therefore, there is a printed circuit pattern between the second bond finger and one solder ball pad, and a wire bond between the first bond finger and one of the bond pads. There is no support for no printed circuit pattern between the second bond finger and any of the solder ball pads, and no wire bond between the first bond finger and any of the bond pads, as recited in claims 29-31, respectively.

There is no support for the claimed limitation of a wire bond having one end affixed to the first printed circuit pattern and the other end affixed to the second printed circuit pattern, as recited in claim 43.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 28-34, 36-38, 40 and 42-46 are rejected under 35 U.S.C. 103(a) as being unpatentable over Smith (6,707,149).

Regarding claims 28 and 43, Smith teaches in figure 5B and related text a semiconductor package comprising:

- a substrate having a plurality of first printed circuit bond fingers 36 formed on the surface of the substrate;

- a semiconductor chip 38 (see figure 9) having a plurality of bond pads 42 formed thereon;

- a plurality of first printed circuit solder ball pads (column 4, lines 59-60) formed on the surface of the substrate;

- a printed circuit pattern formed on the surface of the substrate between each of a group of first printed circuit bond fingers 36 and a corresponding first solder ball pad;

- a wire bond (see column 7, lines 48-50) formed between each of the group of first printed circuit bond fingers and a corresponding bond pad thereby electrically connecting each of the corresponding bond pads to a first solder ball pad;

- a second printed circuit bond finger formed on the surface of the substrate;

- a second printed circuit solder ball pad formed on the surface of the substrate;

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a printed circuit pattern formed on the surface of the substrate between the second printed circuit bond finger and the second printed circuit solder ball pads;

a third printed circuit bond finger formed on the surface of the substrate;

a wire bond having one end affixed to the third bond finger and the other end affixed to one of the bond pads; and

a wire bond having one end affixed to the second bond finger and the other end affixed to the third bond fingers (the horizontal line) thereby electrically connecting said one bond pad to said second printed circuit solder ball pad.

Smith does not explicitly state in the embodiment of figure 5B that a bond finger is connected to a solder ball pad.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to connect a first bond finger to a solder ball pad in Smith's device in order to provide external connection to the bond pad.

Regarding claims 29-31, Smith teaches in figure 5B and related text no printed circuit pattern between the third bond finger and any of the solder ball pads, and no wire bonding between the second bond finger and any of the bond pads.

Regarding claims 32 and 44, Smith teaches in figure 5B and related text an encapsulant 78 for encapsulating the semiconductor chip and wire bond.

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Regarding claims 33 and 45, Smith teaches in figure 5B and related text a solder ball connected to the one solder ball pad.

Regarding claim 34, Smith teaches in figure 5B and related text a substrate is a single layer substrate on which a printed circuit pattern is formed.

Regarding claim 36, Smith teaches in figure 5B and related text a solder mask is not formed on the added bond finger.

Regarding claim 37, Smith teaches in figure 5B and related text the wire bonds are formed over the substrate.

Regarding claim 38, Smith teaches in figure 5B and related text the second wire bond between the second and third bond fingers is formed on an outer region of the substrate on which the semiconductor chip is mounted.

Regarding claim 40, Smith teaches in figure 4 the semiconductor chip 38 is attached to the substrate 28 using an adhesive 26.

Regarding claim 42, Smith teaches in figure 5B and related text the first bond fingers have the same pad shape as that of the second bond finger.

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Regarding claim 46, Smith teaches in figure 5B and related text the first and second printed circuit patterns each have a width that enables wire bonding to be performed thereon.

Claim 35 is rejected under 35 U.S.C. 103(a) as being unpatentable Smith in view of Sota et al. (6,064,111).

Smith teaches substantially the entire claimed structure, as applied to claim 28 above, except a substrate is a double layer substrate.

Sota et al. teach the double layer substrate (column 7, lines 17-20).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to incorporate the teaching of Sota et al. into the device taught by Smith in order to improve the interchangeability of the semiconductor device in the double layer substrate.

Response to Arguments

Applicant argues that Smith does not teach a wire bond connections between pads 36, as recited in column 7, lines 13 et seq of Smith.

The examiner agrees that Smith does not teach a wire bond connections between pads 36, in column 7, lines 13 et seq. However, the cited passage describes the embodiment of figure 3, whereas the claimed invention is rejected over the embodiment of figure 5.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ori Nadav whose telephone number is 571-272-1660. The examiner can normally be reached between the hours of 7 AM to 4 PM (Eastern Standard Time) Monday through Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Eddie Lee can be reached on 571-272-1732. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



O.N.
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